Physics 211BR: Holography and the Infrared Structure of Gravity
Harvard University, Spring 2023

Meeting Time: Wednesday 3:00 – 5:00pm, Jefferson 453

Instructor: Andrew Strominger
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Teaching Fellows: Mina Himwich, Erin Crawley
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Office Hours (Mina): Thursday, 3:30pm – 4:30pm, Jefferson 459
Office Hours (Erin): Tuesday, 11:00am – 12:00pm, Jefferson 465

Course Description: A pedagogical introduction to soft theorems, asymptotic symmetries and memory effects in gravitational, abelian and nonabelian gauge theories; the triangle of equivalence relations between them and the problem of holographically reformulating quantum gravity in four-dimensional asymptotically flat spacetimes.

The grade will be based on the homework and class participation. Problem sets and reading assignments will be posted every two weeks, usually within a day or two after class. There will be no final exam.

Class questions, discussion and participation are strongly encouraged. There will be a five minute stretch break at 4:00 every class.

Pass/fail enrollment is accepted for undergraduate and non-Harvard students. Passing requires full attendance and completion of one problem on each homework.

Textbook: The first half of the course will follow the book *Lectures on the Infrared Structure of Gravity and Gauge Theory* [1].

Prerequisite: General relativity at the level of Physics 210 or equivalent, as well as familiarity with QFT at the level of Physics 253a or equivalent.

References

[1] A. Strominger, *Lectures on the Infrared Structure of Gravity and Gauge Theory*. Princeton University Press, 2018. `arXiv:1703.05448 [hep-th]`.